Electrochemical based processes enabling different replication steps for large area low cost surface nano structuring

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Electrochemical based processes enabling different replication steps for large area low cost surface nano structuring.

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Abstract

The prospect of developing master making solutions with capability of structuring large areas and 3D geometries (see fig. 1) involving low cost production and not necessarily confined into clean-room facilities is presented. In particular the current study investigates the possibility of reducing fabrication time (from 24 hours to 1 hour) of parallel alumina arrays formed by electro-oxidation of high-purity aluminium substrates. Different surface topographies from different electrochemical replication steps are qualitatively and quantitatively characterized by SEM and AFM respectively. Effect of the different time treatment in acidic electrolytes on original pure aluminium substrates is quantified by dimensional measurements on the corresponding replicated nickel semi spheres like pattern substrate used for later injection moulding.

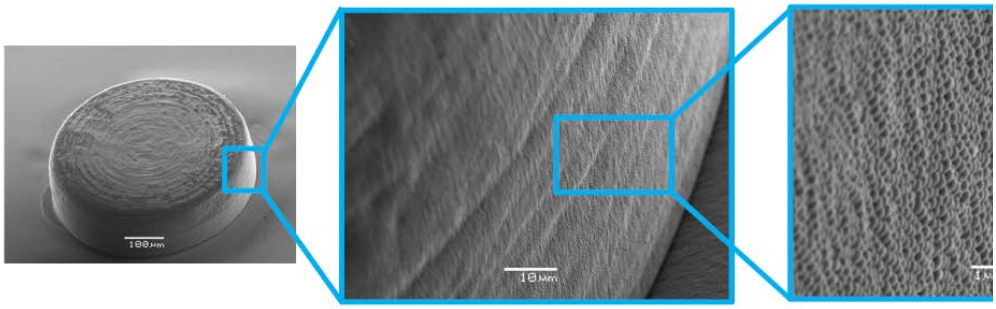

Figure 1: SEM pictures of nickel patterned geometries vertical walls.